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Running Head: MARKETABILITY OF AN INTERPRETIVE APPLICATION

OPPORTUNITIES OF AN INTERPRETIVE APPLICATION FOR
SELF-GUIDED TOURISM WITHIN THE NATIONAL PARK SYSTEM

by

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A PROFESSIONAL PROJECT

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Chair Dr. Adam Wagler

Introduction

On March 1, 1872, Congress passed the Yellowstone Park Act, establishing Yellowstone as the nation's first national park after constant political pressure from the Northern Pacific Railroad (Sellars, 1997; Johns, 1996; Butler, 2006). In the 19th century, tourism was on the rise as an attractive land use with an economic return and the nation's railroads were at the forefront of the park movement as a means to profit. The history of the National Park Service (NPS) is a delayed and winding one, with the introduction of several national parks before the invention of the Park Service. As the railroads accelerated tourism, there existed no singular entity for park and monument management (Sellars, 1997). The United States Army patrolled the newly adopted parks administered by the Department of the Interior, while management of national monuments was split between the War Department and the Forest Service, a division of the Department of Agriculture (Sellars, 1997; Dillion et al., 2002). On August 25, 1916, President Woodrow endorsed the Organic Act creating the National Park Service:

The Service thus established shall promote and regulate the use of the Federal areas known as national parks, monuments and reservations...by such means and measures as conform to the fundamental purpose of the said parks, monuments and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations. (National Park Service, 2014)

The Organic Act of 1916, along with the Reorganization Act of 1933, transferred all existing and future national parks, monuments, and military sites into the capable hands of the National Park Service of the Department of the Interior (National Park Service, 2014). Even in the midst of such confusion, it became evident that the enjoyment of these public places could cultivate preservation of the parks. Thus Stephen Mather, the first Director of the Park Service and his secretary, Horace Albright, emphasized the educational value of the parks (Dillion et al., 2002). Consequently, learning-oriented activities like campfire talks, nature walks, and museum displays emerged in the 20s and 30s throughout the park system (Sellars, 1997).

Education and interpretation were not specifically stated in the mission of the National Park Service, but were soon seen as a means to fulfill the Park Service's objective of preservation. At their induction, educational and interpretive programs were undertaken by dedicated naturalists outside of the National Park Service. The movement of interpretation was supported and advanced by many men including John Muir, Enos Mills, and Freeman Tilden. From the writings of these men, interpretation grew as a field and become recognized as a legitimate discipline. Enos Mills pioneered the use of the term interpretation in reference to nature guiding, (Beck & Cable, 2002) and there have been numerous definitions of the term since its conception. The term interpreter alone establishes the idea of translation from one language into another. While the concept of translation is relevant to the definition of interpretation, the term refers to the translation of natural, scientific, or cultural subject matter into readily accessible content for the lay person. Interpretation is employed in parks, refuges, reserves, museums, aquariums, and zoos (Jacobson, 1999). Over the years, each successive definition of the term has built on its predecessors, starting with the first published definition in *Interpreting Our Heritage* (1957) by Freeman Tilden. As an industry standard and for the

purposes of this project, the term interpretation as defined by the National Association for Interpretation “is a mission based communication process that forges emotional and intellectual connections between the interests of the audience and the meanings inherent in the resource” (Merriman & Brochu, 2006, p. 49).

Susan K. Jacobson successfully articulates the necessity of interpretation in *Communication Skills for Conservation Professionals* (1999), “On a broad scale, the fate of our wilderness and natural resources depends on effective communication.” (p. 2). The primary issue being faced by the National Park Service today is a decrease in funding from the federal government. Between 2001 and 2011, the National Park Service saw a budget cut of nearly \$400 million, a 13 percent decrease in funding (National Parks Conservation Association, 2011). Recently, within the last four years, NPS has seen an eight percent cut in their budget, which is roughly \$190 million (National Parks Conservation Association, 2014). The consequences of these funding reductions include diminished site maintenance, visitor center closures, and decreased park staff for several national parks leading to fewer educational programs, slower emergency response times, and longer lines at entrance stations (Wilderness Society, 2013; National Parks Conservation Association, 2011). Fewer park rangers translates into missing experiences for park visitors and missed opportunities on the part of the organization (NPS) to make meaningful interpretive contacts that assist the National Park Service in achieving its mission of conservation.

Another concern is NPS sites which have never provided rangers due to their attendance rates, size, or geographical scope of the resource, but possess historical and national wonders unique and significant in the formation of our nation as it exists today. The National Trails system under the protection of NPS falls within this sphere. The purpose of this project is to

explore modern alternatives to in-park ranger interpretation that would allow for similar interactive experiences for the visitor while meeting the expectations and needs of the visitor. The outcome of this project focused on the interpretation of the Oregon National Historic Trail within the National Trails system.

There exists an overlap between the principles relevant to interpretation and those of advertising and public relations. The most basic guideline of “know your audience” applies to the field of interpretation; the audience must be met where they live. It is evident the techniques of interpretation have evolved through the decades as indicated by Freeman Tilden in *Interpreting Our Heritage* (1977). What began as a world of paper brochures and stationary exhibits has transformed into audio-visual media and websites. In the words of Tilden, “In the field of interpretation, the gadget has come to stay, and will be used to a much greater extent” (Tilden, 1977, p. 95). Tilden also stressed the importance of choosing the proper technique and delivery methods, and not employing technology for technology’s sake. In today’s mobile and digitally-distracted society, park interpretation must adapt yet again to reach its target. This includes the utilization of mobile applications in the park setting.

Mobile applications are a growing presence in the tourism industry including galleries and museums, as well as in educational domains (New Media Consortium, 2012; Tallon & Froes, 2011). As the percentage of smart phone ownership increases and the number of rangers declines by the hundreds, mobile guides will become indispensable to the National Park Service’s goal of interpretation and educating the public (Nielsen, 2012). Thus in an attempt to examine alternatives to in-person interpretation, a mobile application for the Oregon National Historic Trail within the state of Nebraska was produced as part of this project.

Primary and secondary market research was conducted to ensure the successful outcome of the app within the given market. In particular, this research was meant evaluate both the current market of national park mobile applications and consumer sentiment of existing apps as well as consumers' desires for future NPS mobile apps. The research specifically addressed (RQ1) if an NPS interpretive mobile application designed to encompass a state-wide geographic scale would be downloaded by current national park visitors. Given the scope of the Oregon National Historic Trail, this was an important point to address for success within the market. Other areas addressed by primary and secondary research (RQ2) included what current mobile application features national park visitors use most, what features they would add to current mobile applications and what features they learn best from among existing interpretive or educational mobile applications.

Market Analysis

Secondary market research was conducted in the form of a market analysis. The market analysis was used as an evaluation of current national park mobile applications on the market including an examination of which mobile app features users appreciated, what features they felt were missing and any features they found problematic or useless. The purpose of the market analysis was to indicate which areas needed to be further addressed with primary research. The market analysis provided a foundation for primary research in the form of a survey. An established taxonomy from the literature was used while conducting the market analysis for purposes of organization.

The market of cellular phone and tablet applications (apps) has been categorized into multiple taxonomies within the literature. One is reviewed here and will help in the organization of the current tourism applications market. In a taxonomy established by Kennedy-Eden and

Gretzel (2012), mobile tourism applications are first characterized on the basis of services and secondly on the level of interactivity based on the element of customization the application provides the user. Services are determined on the basis of the functional benefits provided by the application thus focusing on the perceived added value of the app. This taxonomy operates as a conceptual framework to decipher differences and similarities between applications, aiding in the understanding of their position and how they function within the consumer market of mobile tourism applications.

Seven sub-categories are found within the services category of the taxonomy: navigation, social, mobile marketing, security/emergency, transactional, entertainment, and information (Kennedy-Eden & Gretzel, 2012). The largest of these sub-categories is “information” due to the broad definition encompassed and the breadth of mobile application in the current market.

Again, seven sub-categories exist under the main category of user interactivity: personal preferences, location, security, augmented via the web, content addition, aesthetic changes, and no interaction. A portion of these sub-categories require further explanation as they are less self-explanatory than those under the services heading. The sub-category security involves an app’s ability to allow the user to control the flow of their personal information. In regard to mobile applications, this entails data retrieval (push) and access permissions for personal information. Mobile applications that can only be customized through interaction with a webpage on a computer are considered part of the “augmented via the web” sub-category. Lastly, content added apps are those in constant flux, changing with the addition of user content. These mobile applications can include travel logs and apps with photo sharing capabilities.

In regard to mobile tourism applications for the National Park Service, two segments exist: those hosted by the NPS and those produced by outside entities. A majority of NPS apps,

regardless of sponsor, are contained within the service sub-categories of navigation and information, but vary in the level of user interactivity and are supported by both Apple and Android operating systems. NPS mobile tourism applications are segmented according to region, park, or site.

Chesapeake Explorer

The Chesapeake Explorer mobile application is an official NPS application that encompasses services for a regional area, the Chesapeake Watershed, within six US states. This region contains over 400 sites under the National Park Service. The mobile app is purely dedicated to way finding and providing park information, with services like maps, geo-location driving directions, guided tours, and site visitor information, but does provide minor services in the social sub-category allowing users to send digital postcards to others and link to Twitter and Facebook. In terms of interactivity, the app supports lower levels of content addition which can be seen through options such as creating a log of favorite sites in the region, tagging places visited, and creating digital postcards. Chesapeake Explorer utilizes the phone's GPS to provide maps and directions for users, as well as locating nearby activities, national parks, trails and historical sites. Users can customize searches according to activity, site type, or national park name, and can build personalized tours based on user interests or follow an existing suggested tour.

Similar applications in geographical scope and user functions in the NPS mobile app market include:

- Canyon Country National Parks, a tourism app produced by the Utah travel site Utah.com. It includes mobile services for eight national parks and other sites within the NPS in portions of four states within the southwest region. Users can interact with park

and region maps, locate area lodging and dining options, explore pictures and information for over 140 sites, and share their findings via Facebook and Twitter.

- Black Hills & Badlands of South Dakota, a mobile application created by Nomad Mobile Guides for the South Dakota Department of Tourism. The app features informative guides for six NPS sites, state parks, and trails as well as amenities such as food and lodging which can be found in the local communities. Also, this mobile application boasts travel deals and coupons and falls within the service sub-category of mobile marketing.

NPS National Mall and Memorial Parks

This official NPS mobile application takes on a narrower scope than those previously mentioned as the geographic scale of this app is confined to a single city. Visitors to the Washington, D.C. area can utilize the app to navigate 70 cultural and historical sites and gain interpretive information. Many of the features will be identifiable to individuals that have used Chesapeake Explorer. This NPS app provides users with maps, tours, site information, and the ability to create digital postcards. The geo-location directions generated have been adjusted to fit the scale of the area, thus the app provides users with walking directions and estimated travel times. An interesting app feature to note, which is original to this application, is the augmented reality function, Park Lens. By using the mobile device's camera, the application pinpoints locations around the user with labels, granting the individual access to information on which sites are around them.

It is evident from the services offered by the NPS National Mall and Memorial Parks mobile app that the application fulfills navigation and information needs of users. The degree to which this tourism application acts in a social capacity is minimized as it does not possess links

to social media. The application's level of user interactivity is limited to the sub-categories of location and personal preferences, which can be seen in the application's capabilities such as providing users with geo-location direction, augmented reality, and customizable tours. While it could be argued the mobile app allows for a content added function via the photo sharing potential of the digital postcards, this constitutes an insignificant portion of the app making content addition negligible compared to the other interactivity functions of location and personalization.

A variety of NPS mobile tourism applications are on the market that provide similar services to NPS National Mall and Memorial Parks app within comparable areas of geographic size:

- NPS Boston, an official NPS mobile application focused on historical colonial Boston sites associated with the country's fight for independence. This app is virtually identical to NPS National Mall and Memorial Parks save the National Mall's augmented reality function.
- Visit Harpers Ferry - Bolivar, a mobile tourism application produced by Harpers Ferry Historic Town Foundation focusing on cultural and historic places of interest within Harpers Ferry National Historical Park, six other NPS sites, and nearby the towns of Bolivar and Jefferson County. This application offers users more extensive information pertaining to the local communities and transportation.

NPS Independence National Historical Park

This mobile application produced by NPS narrows in scope to a single site in the National Park Service, Independence National Historical Park in Pennsylvania. Again, this application will look familiar to users of the previous two mobile apps in regard to services it

offers users. Users can access the park map, interpretive information about the site and its artifacts, current event and program information, self-guided tours and create digital postcards through this mobile platform. The services provided by this mobile tourism app are abridged from the previous NPS applications covering larger geographical scopes. It does not allow users the option to modify tours to comply with personal preferences nor does it provide walking directions, thus the interactivity sub-categories applicable to the mobile app are limited to location. With similar services as the aforementioned NPS tourism applications, the app for Independence National Historical Park falls under the same sub-categories of navigation and information with minimal associations to the social sub-category.

Other mobile tourism applications with similar functions and limited geographical scopes focusing on a single park include:

- Mount Rushmore Virtual Tour, an unofficial NPS mobile application that focuses on interpretive aspects, providing users with an educational narrated tour around the site, a virtual tour of the monument, 360° views, and 3D scans of the mountain. The makers of Mount Rushmore Virtual Tour also create Fort Laramie, a mobile with the same capabilities as the Mount Rushmore mobile application.
- Chimani Yellowstone NP, one of fourteen mobile apps created for the most popular national parks based on attendance. This application is extensive, focusing on every aspect of a visitor's experience in the park including hiking trails, park amenities, audio and auto tours, museum and prime wildlife viewing locations, geo-location maps, park event schedules, leave no trace guidelines and a safety section, and sunrise and sunset times. The maps can be edited to match personal preferences which can be downloaded to function on a mobile device

offline. Push notifications are utilized by the application to relay app updates and park alerts and news, placing this app into the security sub-category. Chimani's other NPS mobile apps were produced for the following parks: Acadia National Park, Bryce Canyon National Park, Cape Cod National Seashore, Cuyahoga Valley National Park, Glacier National Park, Grand Canyon National Park, Grand Teton National Park, Great Smoky Mountains National Park, Olympic National Park, Rocky Mountain National Park, Sequoia and Kings Canyon National Park, Yosemite National Park, and Zion National Park.

- NPS Yosemite, a mobile tourism application produced by the Yosemite Conservancy featuring over 50 landmarks in the park, park visitor information including park amenities, park programs and event schedules, maps and suggested hiking trails, and direct access to the park's Twitter feed and blogs.
- Fort Vancouver Mobile, is an interpretive mobile application created for Fort Vancouver National Historic Site as an educational tour through The Village including text, audio, and video.
- Yellowstone National Park - The Official Guide, an NPS app sponsored by The Yellowstone Association and created by Nomad Mobile Guides. This mobile tourism app includes a park map, location of park services, safety information for wildlife viewing, and guided tours and hikes. Application functions like the map are not reliant on GPS, allowing them to be utilized at all times. This particular app is one of four designed by Nomad for various supporting park foundations. The other mobile applications include: Arches - The Official Guide sponsored by Canyonlands Natural History Association, Great Smokies - The Official Guide

sponsored by the Great Smoky Mountains Association, and Grand Teton National Park & Jackson Hole - The Official Guide sponsored by the Grand Teton Association. The official guide to Arches National Park offers the park's Junior Ranger program on a mobile platform.

Passport to Your National Parks

The Passport mobile tourism application was created by Eastern National, a supporting organization of the National Park Service, offering a wider scope of national parks incorporated in the platform. This app provides users with links to 397 NPS websites to access visitor information, dedicated space to add their own photos and accounts of their trips, and passport stamps to keep track of the parks they have visited. Users can create a personalized map of parks on their must-visit list, connect to the NPS store, and find nearby national parks via a GPS mapping function. The Passport mobile application presents users with services in the sub-categories of navigation, transactional, and information. The customization functions afforded to users indicate user interactivity of the Passport mobile application as belonging to the sub-categories personal preferences, location, and content addition. Mobile tourism applications similar in function and scope include:

- National Parks by National Geographic, an unofficial NPS app produced by the National Geographic Society. This application offers users park maps, photography tips, weather information, and park visitor information for the 25 most visited national parks. Users can filter maps according to activity or the season of their intended visit, read suggested must-sees and must-dos for each park, and collect digital stamps at each park they visit. The app links to Twitter and Facebook and possess a personalized space where users can log their favorite parks and compile itineraries and photos.

- Parkopolo, a mobile directory of all NPS sites. Users can search for parks based on their current location or interests and obtain park visitor information such as park hours and activities.

While this list is nowhere exhaustive, it is a substantial examination into the current categories and capabilities of existing mobile tourism applications with particular concern for major NPS apps on the market.

After an examination of the current market of National Park mobile applications, it was noted that there is no drastic differentiating aspect between official National Park mobile applications and those that are unofficial. Official National Park apps are free and do not support advertisements, though most of the mobile applications reviewed in this market analysis do not use advertising sponsors. Limited to only five apps, official National Park mobile apps are all-inclusive at no cost. It is in this area that a slight difference between the official and unofficial park applications emerges. Only in some of the unofficial mobile apps are in-app purchases necessary to access all content. For example, the news and My Chimani functions of all the Chimani brand National Park applications must be purchased.

In exploring customer ratings and reviews, trends developed in consumer opinions, which is important to note as a preliminary step in the application development process. Consumers appreciate in-depth information rather than a basic overview; however, it would seem that even an introduction to basic park information is appreciated when access to a park ranger is absent. Specific in-depth information constantly requested includes: park hours of operation, wayfinding information such as maps and directions, admission costs, guided tours, current park events and attractions, and park alerts.

The topic of wireless and mobile network use within the parks was of substantial concern to consumers, especially in regard to maps. The main attitude is that maps should have the capability of being downloaded to the phone, thus having the capacity to be utilized offline. Most consumers shared the sentiment that if the application is free, but the maps cannot be downloaded, it is worth the money to purchase a mobile application that will allow downloads. Also concerning network connection, consumers express the opinion that park apps should act as standalone entities. They dislike the current National Park mobile apps which are actually mobile websites in disguise and those that redirect the user to websites which require a mobile network and reception.

Personalization elements of the mobile platform such as favorites, tracking dates of a visit or a tour route, making notes, or checklists of places visited act as a strong point of differentiation between National Park mobile applications. Consumers desire mobile apps to serve more than just information and navigation functions, they request capabilities to capture, save, and share memories through social media or direct transfer of account information to a personal computer.

Methods

Informed by the findings from the market analysis, discussed immediately prior, a survey including both quantitative and qualitative questions was created to examine the marketability and usability of smart phone applications as they pertain to interpretive applications. A survey was used to access a diverse array of participants providing a high level of representativeness of the population of park visitors that traditional forms of data collection would not allow within a limited time frame. The survey was approved by the Institutional Review Board at the University of Nebraska - Lincoln and piloted to ensure test logic was operating properly, that questions were

clearly expressed, and all answer options were truly exhaustive. A copy of the survey can be found in Appendix A. The primary research was conducted through this survey which was distributed on a national scale through electronic means: the Facebook pages of NOLS Wilderness Medicine Institute and John Day Fossil Beds National Monument and the subreddits of Outdoors, nationalparks, CampingandHiking, camping, SampleSize, and roadtrip on the social aggregate news site Reddit.com. These digital distribution sites were selected based on their pertinence to material relating directly or indirectly to the National Park Service or surveys in general (SampleSize subreddit). Permission was then acquired for posting to Facebook profiles. Subreddits are open forums in which postings must match topics and follow given guidelines. For example, on the subreddit SampleSize, post titles must include survey topic and sample demographic the research is recruiting. Participants opted-in to the survey through self-selective means in which they utilized their own computing systems to complete the survey, in the place of their choosing and at their own speed. The survey instrument was created and hosted by the site SurveyMonkey and was a combination of open and closed questions including multiple choice, Likert scale to establish preferences, and free response. The population of interest was adult smart phone users 19 years of age or older within the United States. The survey was available for two weeks beginning December 1, 2014 and ending December 14, 2014 to ensure similar treatment and experiences.

Analysis methods relied on descriptive statistics in the forms of frequencies and contingency tables. The analysis was performed through a number of methods, depending on the complexity of the answers being examined. Hand-counts, Excel and SAS were used in data analysis of the survey.

Survey data was then used to build a working prototype of the app using InVision. This prototype underwent usability testing with ten undergraduate students (users) from the College of Journalism and Mass Communications at the University of Nebraska - Lincoln. Usability testing was used as a means to identify any navigational issues with the mobile app as well as determine user satisfaction. This was done in two ways, observation on part of the researcher and written feedback from the test user. The observation portion allowed the researcher to objectively pick up on unspoken usability issues in which a test user may not indicate a problem, but an issue existed which needed correcting. Users were selected via convenience sampling and were compensated monetarily for their time. Users were asked a series of questions and given a variety of tasks to perform using the app prototype. Each task related to the main functions of the Oregon Trail app: sites, tours and maps. The tasks performed were the same for each test user. All test users were observed by the primary investigator during completion of the tasks. Three test users were Android users and seven were iOS users. A small subset (three) of the test users was chosen to test the app on a mobile platform (Android) instead of a computer interface. All other test users completed testing on a PC platform provided by the researcher at the testing location. User actions and responses were recorded by the researcher on a usability testing worksheet to ensure homogeneity in collected responses (see Appendix B). At the end of testing, users were asked to complete a short written evaluation (see Appendix C) on their experience interacting with the app and its design. The usability material for testing which includes the worksheet and short evaluation was originally created by Dr. Adam Wagler, assistant professor, of the College of Journalism and Mass Communications at the University of Nebraska - Lincoln.

Survey Results

The goals of the survey were to determine (RQ1) if an NPS interpretive mobile application designed to encompass a state-wide geographic scale would be downloaded by current national park visitors as well as establish (RQ2) what current mobile application features national park visitors use most, what features they would add and what features they learn best from among existing interpretive or educational mobile applications including NPS apps to ensure the success of a National Park Service application in the current mobile app market.

A total of 234 responses were collected, with 201 viable responses. Of these 201 respondents, 63 were female, 108 were male and 30 did not provide their gender. Participants were ages 19 through 63 with an average age of 28 years. A majority of participants identified their ethnicity as Caucasian (74.13%). Other reported ethnicities include Asian/Pacific Islander (3.48%), Hispanic (1%), Native American (1%), multi-racial (1%), Middle Eastern (.5%), Indian (.5%), Romani (.5%). Additionally, 36 respondents (17.91%) did not provide their ethnicity. According to the National Park Service Comprehensive Survey of the American Public (2011), demographic representation of national park visitors was as follows: 78% non-Hispanic whites, 9% Hispanic, 7% African American, 3% Asian, and 1% American Indian/Alaskan (Taylor, Grandjean, & Gramann). Thus when comparing these figures, it is seen that the collected sample of respondents is roughly representative of park visitors.

Respondents were asked to report when they last visited a national park. Of participants that responded, the majority have visited a national park less than a year ago (72.5%), followed by one to two years ago (16.5%), while those that have three to four years ago and last visited a park five years ago or over account for 3% and 3% of the respondents. Five percent of respondents indicated they have never been to a national park.

To help gauge usage, participants were asked how many parks they have visited within the last five years. 27.36% of respondents have visited 1 to 4 parks within the last five years, followed by 24.88% of respondents that have visited 5 to 9 parks, 24.38% that have visited 16 or more, and 17.91% that have visited 10 to 15 parks within the last five years. Again, five percent of respondents indicated they have never been to a national park.

Data from these two factors were placed in a contingency table (see Appendix D) to determine level of use for survey participants. The majority of respondents have been to a park within the last year. Of those 145 respondents, 18.7% visited 1 to 4 parks in the past five years, 26.9% visited 5 to 9 parks, 22.1% visited 10 to 15 parks, and 32.4% visited 16 or more national parks. These figures indicate the majority of the sample is heavy to moderate users of national parks.

The majority operating system used by respondents is split evenly between Android (48.76%) and iOS (49.25%) users. Other operating systems reported by respondents were Windows (1.49%) and BlackBerry (.50%). As of December 2013, Android holds a majority share of the smartphone operating system market with 51% of the market, followed closely by iOS (42%) with the last 7% of the market being run on BlackBerry and Microsoft operating systems (comScore, 2014).

In regard to internet access, 99.50% of respondents can access the internet in some shape or form. It should be noted that smartphones today have the capacity to gain internet access in multiple ways and strengths and this element of the smartphone will be ever increasing. Of those that have phones capable of internet access, 17% of participants responded that they have 1X internet access, 15.5% have 2G, 50% have 3G, 41.5% have 4G, 66% have 4G LTE, and 71.5%

have WiFi internet access on their phones, while 2% of respondents were unaware of what connection they had but knew their phone was capable of accessing the internet.

178 out of 201 respondents said they have never used a National Park Service mobile app. Of this 89.45% of participants that have not used an NPS app, 62.92% stated not knowing an app existed as the reason why they have not. 12.36% stated there was no need for an app, 8.43% said they just did not think of it at the time, 6.18% listed no service in the parks as why they have never used a NPS app, and 2.81% stated an app did not exist for the site they had visited. Four respondents had never been to a National Park site and four did not have a smartphone at the time of their visit. Two participants have smartphones with operating systems other than iOS or Android which are the only platforms NPS apps run on. Six respondents recorded unique responses including a lack of trust in the government, a lack of trust in technology, the preference to use a different app instead, and lack of content provided.

21 of the 201 respondents have used an NPS mobile app. While two participants declined to state which app they have used, eight indicated they have used the National Mall app, seven indicated the Yosemite app, and five have used the Yellowstone Geysers app. Four respondents provided names of national park mobile applications they had used via the free-answer “other” option. It was noted that the listed apps in the open ended option were not directly produced by the NPS: National Geographic National Parks app, the Official Great Smoky Mountains app, and Passport to Your National Parks. The Great Smokies guide was created by Nomad Mobile Guides and commissioned by the Great Smoky Mountains Association and the National Parks Passport app was made by Eastern National. Both of the previously mentioned organizations are booster groups for the Great Smoky Mountains National Park and selected national parks in the eastern United States respectively.

134 respondents indicated they use or have used some other tourist application. In understanding the purpose of other travel apps that consumers currently use or have used, participants were asked in open-ended format which travel apps they have used. These responses were coded according to major functions of the app fitting into one or more of the following categories: booking, maps, guides, ratings/reviews, planning/info, interpretation and miscellaneous. Booking apps encompass mobile applications which allow users to book travel as well as accommodations like Travelocity or Kayak. This type of app was the most reported kind by survey respondents with 41.04% listing a booking app. 32.84% listed a rating or review app such as TripAdvisor in which users to rate hotels, restaurants, and attractions. 19.4% listed a general maps application and 16.42% reported a planning or general information app. Planning and general information apps included those used for weather forecasts and those used in the planning process such as Roadtrippers, a mobile application which users can take advantage of planning features such as gas price estimation and blogs to plot and preplan stops. 15.67% of participants listed a guide application. These apps are general topic such as field guides or park guides such as AllTrails or Chimani national park apps which guide users in areas such as Leave No Trace ethics, park safety and points of interest. Five participants (3.73%) identified interpretation apps such as The Field Museum app. Ten respondents provided miscellaneous mobile applications. Miscellaneous apps included social applications such as Reddit and Foursquare, experiential apps like Passport to Your National Parks and other resources applications like WiFi Finder, YP, and camp cooking. Respondents also listed an array of travel and tourism websites as well including: the National Park websites, hikingupward.com, localhikes.com, GeoBetty.com, Backpacker.com, Backcountry.com, trails.com, hotels.com, TripAdvisor, Reddit, Yelp, Kayak, and “local forums”.

Participants were asked, in regard to NPS or other travel and tourism apps they have used or would use, to select features they found to be most helpful from a list of features or submit their own. Participants had the option of selecting as many or as few of the features that applied to them. Of the sample, 24.88% selected personalized tours, 79.6% selected maps, 56.72% selected wildlife guides, 5.97% interactive educational games, 76.62% selected destination information, and 68.16% selected visitor notifications. Of those features submitted by survey respondents, it was noted that some fit into the aforementioned pre-existing categories. New features presented include: booking and purchasing options for campground reservations, camping sites, tickets, and parking and backcountry permits, social functions such as campground and trail reviews and “notes from other visitors,” general outdoor awareness material like environmental etiquette and Leave No Trace guidelines, and the ability to run fully or partially offline.

The following survey question asked participants what features they would add to a national park or other tourist app as a means to gauge desired functions. The open-ended responses were first read and assessed by the researcher to develop the following coding categories: visitor notifications including weather alerts and road conditions, tours/itineraries, guides, offline usage, social aspects including reviews, destination information which encompasses hours, rates, rules and regulations, GPS enabled information, (better) maps and navigation functions, booking/purchasing options, and miscellaneous; and then coded accordingly. Of the 57 responses garnered, 13 participants would add better maps or wayfinding features to a national park or tourist mobile application, seven would add an offline usage capability to the app, six would add a social aspect, more or different destination information or GPS enabled information, five stated they would add visitor notifications for weather alerts and

road conditions, four would add a personalized or self-guided tour function, and three would add guides and booking options. One respondent listed “environmental etiquette/how to leave no trace, integration with waypoint apps like cgeo or ingress/field trip.”

The majority (96.59%) of respondents believe a national park or any other tourist application should be capable of running entirely offline. 85.21% of participants find tourist and national park apps that utilize GPS alerts helpful. 94.32% of the sample would download a mobile application that incorporates a GPS wayfinding aspect and 76.14% would download a mobile application guide for an area that encompasses the size of a state.

When asked to identify which topics participants would be interested in using their smartphone or tablet to learn more about, 84.62% of survey respondents identified history, 77.78% culture, and 92.90% identified nature. Participants were then asked to rate their level of agreement via a Likert scale to statements regarding learning styles and preferences. The majority of respondents recorded a positive sentiment toward a tour function that uses text and still images with 83.14% falling into the highly agree and agree categories. When asked to rate their level of agreement with the statement “I would learn best from a mobile application with a tour function that uses audio and video,” 45.35% of survey participants indicated a negative sentiment and 30.23% were neutral. The majority of respondents selected a negative sentiment toward interactive games with 72.10% falling into the highly disagree and disagree categories.

In indicating primary users of the app, respondents were asked to select or report the main user of a national park mobile application in their family. 95.88% of respondents indicated themselves as the primary user of a NPS app, while 4.12% indicated their significant other. It was also noted that while kids was a listed option on the survey instrument, no respondent selected this choice.

The survey examined purchasing aspects involved with mobile applications. 67.25% of participants indicated they would not be willing to pay for additional features after downloading an app for free. This fact was reiterated in the responses recorded for the following question. 53.85% selected the option “free” for the most they would pay for additional features inside a free app, while 14.79% of respondents said the most they would pay is between \$1.00 and \$1.99, 13.61% indicated they would pay between \$0.01 and \$0.99, 7.69% said \$4.00 and over, 7.10% said between \$2.00 and \$2.99, and 2.96% selected between \$3.00 and \$3.99. This indicates that the National Park Service’s pay scheme of an all-inclusive free app is still considered to be the most preferred option in the eyes of consumers.

Lastly, survey participants were asked if they would be willing to purchase a mobile application for use in a national park that was not sponsored by the National Park Service. Responses were evenly split with 47.09% selecting no and 52.91% saying yes.

Usability Findings

The previous survey results informed the creation of a prototype for the Oregon National Historic Trail mobile app. Following the production of this prototype, it underwent usability testing to identify any navigational issues with the mobile app as well as determine user satisfaction in completing tasks that would be considered typical uses of the app. Usability testers were asked to complete a series of tasks and answer several questions pertaining to the purpose and look of the app as well as their experience completing tasks. All test users of the app prototype were able to indicate the purpose of the app from looking at the home screen with some reasonable success, most stating it to be an app for a national park, the Oregon Trail or simply just a park guide. Test users found the home screen of the app to be simple, but clean and hit on the basic needs of what they would expect as part of any tourist application. The app was

“very easy to navigate and understand what app functions do or icons mean,” stated one test user. None of the testers experienced issues when asked to find information on Scotts Bluff National Monument. Two distinct paths were taken by test users to complete this task. The first, a more direct path, was through the “Sites” menu. The second was achieved through the mapping function of the app. Both methods accomplished the given task at a pace fast enough to satisfy the test user.

Users were then asked to add Scotts Bluff National Monument to a personalized tour. Most of the testers had little to no difficulty with this task and went about it in one of two ways. Some went the direct route in through the “Tours” menu and selected the “Create your tour” option. Others add the site via the mapping function of the app. Some test users’ first instinct was to select the “tour” option within the site page. However, this option houses the interpretive material for the tours on the app. They then moved quickly to what they saw as the logical second option and completed the task via the “Tours” menu. One user wrote, “everything went smoothly in my opinion, I just had one little hiccup in creating my own tour.” Nevertheless, there were a few testers that went back and forth between the site information and the tour option within the site page, scrolling up and down the pages thinking they had missed something.

The purpose of the last task was to gauge how well users could navigate through the interpretive material provided within the tours. Test users were told that a park lens was included as part of the interpretive tour material. They were asked to find the park lens in Scotts Bluff’s tour information and use it. Three of the ten test users were able to successfully complete this task. To navigate through the interpretive tour information, a user must swipe left or right through the material as the tour information was built similar to a slideshow function. The majority of the test users would scroll down through the opening page of interpretive material,

but could not navigate to the consecutive pages. They did not attempt to use a swiping motion or indicate to the researcher that they would normally try to swipe as a means to solve the problem. However, when navigating through the park lens function itself, test users did not encounter issues.

The main insight gained from usability testing was that modifications to the interpretive material sections needed to be made to address the navigational issues encountered by users during the test. This is the most significant section of the mobile application as the purpose of the app is to provide interpretation in the absence of a park ranger.

Discussion

The survey responses and usability testing outcomes influenced the structure and functions of the mobile app. A visual map of the structure of the mobile application can be found in Appendix E. This section addresses how the various avenues of research impacted the outcome of the prototype.

The majority (76.14%) of survey respondents indicated they would download a mobile application guide for an area that encompasses the size of a state. This suggests the geographical size encompassed for the guide app does not directly influence the consumer's decision to download the app. More important than the geographical area included by the functions of the app are the information and functions themselves.

According to the survey findings on operating systems, in conjunction with industry figures (comScore, 2014), this mobile application has been designed to run on the Android platform. The vast majority of respondents can access the internet and most prominently through the use of WiFi, but also the services of 3G, 4G and 4G LTE are available among park visitors. However, internet service will continue to be a central factor in creating and maintaining mobile

applications for national parks and other wilderness spaces as expressed in consumer reviews in the market analysis and in the survey responses which indicated a majority of app consumers desire an app which has the capability to run offline. There are a few means to remedy the issues attached to spotty reception areas. The first would be an app that downloads all information directly to the phone thus it could run without an internet connection. The problem with this then becomes the size of the program. Another consideration is a full or partial mesh network. Mesh networks are decentralized local area networks in which nodes communicate directly with one another. Each node within the topology is connected to one or more nodes depending on if the arrangement is full or partial. Mesh networks eliminate the need for a centralized internet service provider (ISP) with the added benefit of a more stable infrastructure due simply to the fact that these configurations remove the risk of a single point of failure (de Filippi, 2014). However, in regard to this mobile application which includes Oregon Trail sites within the state of Nebraska, the vast majority of which are located close to towns and cities within reasonable proximity to main highways, interstates and roads, the probability of no internet access is negligible. Also, wayside stops are usually occupied by vastly small numbers of visitors at any given time therefore partial mesh networking does not seem feasible. Thus internet connectivity does not appear to be an issue for this project.

While service is a vital concern among consumers, a major concern on the side of the organization (NPS) is recognition. A large percentage of respondents have never used a NPS mobile application mainly due to a lack of awareness. Also, making the mobile app seen as a necessity will be crucial for sites strongly utilizing apps as part of their interpretive services. Sites that should make this a priority are those with limited interpretive staffing or those such as the national trails which lack concrete, finite interpretive structures. Rather, information is spread

between sites, a few of which boast visitor centers or museums. Also, there appears to be some confusion between official NPS sponsored apps and others produced by outside entities.

In regard to the app features, the open-ended responses to the question what features participants would add to a national park or other tourist app supported those answers recorded in the previous question of which features they found most helpful. Maps and navigation functions were features that were found to be most helpful and addressed within both free response sections of the survey as well as in customer ratings and reviews of existing park applications. As sites along the Oregon National Historic Trail are not within close proximity to each other, the ability for app consumers to navigate is crucial to the success of the app. Thus interactive maps and a navigation function have included as part of the features of this application. Navigation is obtained through the use of the phone's existing mapping or navigation function (default Google Maps on Android OS) or via a mapping function on the internet.

Among the results, destination information was another area of interest. A majority of survey respondents indicated destination information as a feature they found most helpful. Again, this was supported in the responses received regarding features participants would add to a national park or other tourist application. Specific information visitors are looking for include: site location, contact information, site synopsis, hours, prices, and rules and regulations. These items are included within this app's destination information section along with related pictures. There was also a strong desire among respondents for ratings and reviews. As this presents additional site information to the app user, it could logically be grouped with the destination information within the app. However, there exist intricacies in providing users with a suitable platform for ratings and reviews. Often times, reviews and ratings are accompanied by

usernames and passwords making a database part of the equation. If the designer chooses to forego usernames and passwords, there is an elevated risk of “trolls” and unsolicited use (hijacking forum for some other use) among other security issues. In regard to this mobile application, many of the sites along the Oregon Trail are not occupied by rangers or dense “tourist pools” such as museums. Many stops included in the tours are smaller wayside attractions such as grave spots and wagon ruts. With this in mind, the app attempts to satisfy this consumer need by providing a direct link to the external review source, TripAdvisor, in which ratings already exist for the larger trail sites such as Scotts Bluff National Monument and Chimney Rock National Historic Site.

In an attempt to further fulfill the desire for social aspects of a national park app and to create a sense of cohesion among the existing NPS mobile applications, this app includes a park post card. Traditionally, the park post card function of NPS apps has consisted of a digital 2D postcard frame around a picture taken from the user’s phone. The postcard can then be saved to the phone or shared via email or the user’s social media platform of choice. The Oregon Trail application encompasses stops throughout the entire state of Nebraska. This is a large geographical range, thus the challenge was to present the traditional park post card in a modern, practical, and engaging way. The app’s post card function plays off the length of the tours. Individual pictures are stored on the user’s phone, so that the traditional park post card option is still available to users if they only experience one stop along the trail. These individual pictures are still available to save and share. For those that snap multiple pictures throughout their journey, they have the option to have the app drop them into a short pre-made video reminiscent of a Vine. This video can be emailed, saved on the phone, or shared via social media platforms.

Of the features survey respondents found most helpful, 68.18% selected visitor notifications. Again, this desired feature was reiterated in subsequent sections of the survey. The main visitor notifications of interest are weather alerts and road conditions, but other notifications could relate to event schedules for sites. Closely related to visitor notifications is GPS enabled information as visitor notifications could easily utilize geofencing technology to push notifications and alerts to app users. A majority of participants (85.21%) find NPS and tourist apps that utilize GPS alerts helpful. GPS enabled information could include interpretive material and site alerts which would notify app users that an Oregon Trail site is near. This could be a valuable feature given Oregon Trail sites can be miles apart and is not currently included in the app prototype.

In terms of app functionality for this app, incorporating geofencing to push notifications pertaining to interpretative material and site alerts seems most feasible and advantageous. As the navigation functions are being delegated through the phone's existing mapping function, adding a feature on the app for road condition alerts is unnecessary as the phone's navigation function should provide road condition information in the form of road closures, construction, and detours. Regarding weather alerts, the Oregon Trail app will not include weather notifications. Innately, most smart phones come with a weather widget or app pre-installed which can provide this function for consumers. Most of the sites along the trail within Nebraska do not require hiking or provide trails for hiking. The majority of stops are roadside waysides, thus the risk of being caught in backcountry settings in bad weather is minimal.

Another feature participants (56.72%) found to be most helpful are wildlife guides. Guides were also found to be a desired function by responses in several areas of the survey. 15.67% of participants listed a guide application as one they use or have used in the past and

guides were listed again as an element participants would add to an NPS or other tourist app. In fact, nature was identified as the topic of highest interest to learn about using a smartphone or tablet with 92.90% of survey respondents. While a portion of the interpretive material within the Oregon Trail app lends its hand to addressing nature topics such as geology, it touches more on the history of the trail, migration, and pioneers, as well as the culture of the Plains Indians and clashes between cultures of the pioneers and Native Americans. Just by the inherent nature of the topic of the Oregon Trail, the mobile application more strongly addresses respondents' number two and three topics of interest history (84.62%) and culture (77.78%). However, a nature guide has been added to the app's "more information" section to account for this request. The nature guide is not extensive, but encompasses flora and fauna common to the state that would have been normal encounters on the Oregon Trail. Along with this guide, general outdoor awareness and environmental etiquette material are housed in this same section of the app per requested as an addition to any NPS or tourist app, as well as a means to encourage sustainable use of outdoor spaces and conservation.

As this app is strongly focused on interpretation, a large portion of the application revolves around the presentation of interpretive material via thematic tours. The survey results indicated that 24.88% of participants selected personalized tours as a feature they found to be most helpful. However, personalized and self-guided tour functions were presented as features respondents would add to a NPS or other tourist application, as well as a missing feature criticized by users in customer ratings and reviews of existing apps. As a result, a personalized tour option was added as part of the Oregon Trail mobile application, in order to provide for all markets. In other words, this feature enhances the experience of this minority while not inconveniencing the majority who did not desire this feature or find it particularly helpful. Users

can select stops from the map to be added to a customized tour or be redirected from the tours section of the app to the sites menu to add stops to a customized tour.

An early idea for a portion of the Oregon Trail application had revolved around interactive educational games to appeal and inspire learning among youth. This aspect relied on the assumption that users, secondary or primary, would include children. However, 5.97% of respondents selected interactive educational games as a feature they found to be most helpful in regard to NPS or other travel apps they have used. This is logical considering the vast majority of survey participants (95.88%) indicated themselves as the primary user of the proposed NPS application followed by their significant other (4.12%). And though option existed for survey participants to select their kids as the primary user, none did. Therefore, educational games were left out of the mobile application.

The last desired feature among survey participants to discuss is a booking function. Though not directly provided as an answer option in regard to features participants found most helpful as part of NPS or tourist apps they have used, it was indicated as a helpful feature and a desired one listed by survey respondents in the open-response questions. A booking feature which could include campsite bookings or entry fee purchases has not been added to this app for several reasons. A large majority of the sites on the Oregon Trail are smaller wayside attractions that do not require entry fees. As it stands now, the National Park Service does not have a standard in place for paying single-day admission park fees digitally due to the uniqueness of each park site, however, visitors can purchase annual national park passes online via the U.S. Geological Survey webpage and annual passes for specific park sites. Most Oregon Trail sites in Nebraska also do not offer camping directly at the site, rather camping is available from an external provider at an off-site location.

In regard to learning styles and preferences, the app utilizes text and still images as a majority of respondents indicated positive sentiment toward learning via text and images. However, audio and video are still being incorporated into the interpretive material of the application as a means to make interpretive information accessible to visually impaired users. As stated previously, the app does not include interactive educational games, but the app does incorporate the use of a park lens into the interpretive material. The park lens is an augmented reality function which utilizes the phone's camera to show users a view of the real-world environment while overlaying digital data on to top of this view which could include graphics or video. This aspect of the app is not a new concept, but it is being utilized in a different way. Currently, the NPS National Mall and Memorial Parks app already contains a park lens which it uses as a wayfinding function, but the Oregon Trail app utilizes this augmented reality feature as more of an interpretive function providing an immersive experience for the user. Using augmented reality as a teaching function can provide ranger-like interactions with interpretive material prompting intellectual and emotional connections with resources. The mobile application's park lens includes the use of augmented reality to help users further explore natural phenomenon such as geological structures and appreciate life on the Oregon Trail through living history aspects.

The major issue with the app found during usability testing was navigation through the interpretive tour material. This is a significant concern as the main purpose of the app is to provide interpretive services to site visitors. To remedy this issue, a sub-menu was added to aid navigation through tour interpretive material replacing the original swiping action through the slideshow. Once labeled "tour" on the site page, the title of this tab is now labeled "learn" to curb confusion. This new label should resolve the problem encountered when test users attempted to

add the site to a personalized tour, as now it does not suggest it is directly associated with the tour portion of the app. An add site option was also added to the site page to assist users with the task of creating their own tour. This will give users multiple means to add site to a personalized tour. Detailed images of the completed app pages can be found in Appendix F. These changes should undergo usability testing to ensure they are functioning as desired and rectifying the issues found during the initial usability testing before going further with a beta version.

Future Work

Once a beta version of the app has been created, future research should include monitored and unmonitored field testing of the app. This would include both observing park visitors using the mobile application in a natural environment of use allowing for insight into how the app functions in regard to its intended purpose and a limited release to selected users to test and report on independently. Additionally, at a later date it would be of great interest for a study to be conducted on the impacts of augmented reality on interpretation to determine if it is an effective interpretive technique. A primary question of interest for the later study would address if users of augmented reality are able to accomplish long term recall of interpretive material.

Other research could examine visitor use to determine if there is a difference between mobile application functions desired between heavy and light users of the national parks. This would allow app development to satisfy the needs of as many visitors as possible whether it be providing a more functions into one app or creating another app for the light park user.

This app could easily encompass the Mormon, California and Pony Express trails as part of the National Historic Trails system. The history and time period and locations of sites overlap. The trails are so intertwined that it becomes difficult to explain the significance and chronicles of

one without the others. Thus for thorough interpretation it would be beneficial to extend the app to include these historic trails.

Limitations

The main limitation of this research was within the data collection process via the internet. Only two Facebook pages were utilized during survey dissemination, so most traffic was coming from Reddit. This means the responses received were limited by the demographic of Reddit users which consist of mainly males ages 18-35. Future market research on this subject should attempt more robust distribution techniques utilizing multiple platforms.

Conclusion

The Interpretation and Education Renaissance Action Plan released by the National Park Service in 2006 concluded that NPS interpretive media was on average 20 years behind current technologies and recommended the adoption of new technologies (Oppegaard & Shine, 2014). The plan states the utilization of new technologies should act as a means to supplement the national park experience, “to make intangible meanings available in ways never before imagined” (Oppegaard & Shine, 2014). Exploring means to supplement the NPS experience is even more crucial now with the decrease in employed park rangers and increasing number of visitors to national park sites. Interpretation still remains the key to conservation and preservation. It is a means to an end, therefore increasing quality interpretive experiences in the given environment will result in better outcomes for the park service on a conservation front. By pinpointing weaknesses within the current market of national park mobile applications and in the mechanisms of NPS app recognition, as this research has done, the National Park Service can ensure they are providing the best interpretive experiences to park visitors as possible, especially as they continue to develop more mobile applications. The outcomes and findings of this project

as well as the proposed future research will also be of interest to other interpretative organizations, other park entities not under the NPS umbrella, and other institutions that boast an interpretive mission.

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Appendix A**National Park Service Mobile Applications Survey (IRB#20141114616EX)****Monica Blaser Professional Project - NPS Mobile Apps****1. University of Nebraska – Lincoln Graduate Project****Marketability of an Interpretive Application for Self-Guided Tourism within the National Park System****IRB#20141114616 EX**

This is a research project that focuses on mobile applications and technologies in reference to tourism, resource interpretation, vacations and travel within the context of the National Park Service. This research is being conducted independently of the National Park Service as part of a graduate thesis project by a graduate student at the University of Nebraska - Lincoln. In order to participate you must be 19 years of age or older and own a mobile device such as a smart phone or tablet.

Participation in this study will require approximately 20 minutes. You will be asked to complete 30 survey questions. There are six sections to this survey which encompass introductory questions, mobile device specifics, favored application features, preferred learning environment, purchasing options, and demographics. The survey contains open-ended, multiple choice and multiple answer questions.

There are no known risks or discomforts associated with this research. The results of this study will be used in identifying which mobile application features and device technologies are key in the successful self-guided interpretation of national parks.

Your responses to this survey will be kept confidential and anonymous. The data collected will be stored through the survey administration service, SurveyMonkey. As a means to keep responses anonymous IP addresses will not be collected. Data from the survey will be downloaded to a password protected computer for analysis purposes.

You may ask any questions concerning this research at any time by contacting Monica Blaser at 402-472- 3041 or MonicaBlaser@gmail.com. You may also contact Adam Wagler at 402-472-4784 or adamwagler@unl.edu. If you would like to speak to someone else, please call the Research Compliance Services Office at 402-472-6965 or irb@unl.edu.

Participation in this study is voluntary. You can refuse to participate or withdraw at any time without harming your relationship with the researchers or the University of Nebraska-Lincoln, or in any other way receive a penalty or loss of benefits to which you are

Monica Blaser Professional Project - NPS Mobile Apps
<p>otherwise entitled. Again, this research is being conducted independently of the National Park Service. Refusal to participate or your withdrawal at any time will not harm your relationship with the National Park Service or any of its partners.</p> <p>You are voluntarily making a decision whether or not to participate in this research study. By clicking on the “I Accept” button below, your consent to participate is implied. You should print a copy of this page for your records.</p> <p><input type="radio"/> I Accept <input type="radio"/> I Decline</p>
Introduction
<p>2. Do you own a mobile device such as a smart phone or tablet?</p> <p><input type="radio"/> Yes <input type="radio"/> No</p>
Introduction
<p>3. When did you last visit a national park?</p> <p><input type="radio"/> Less than a year ago.</p> <p><input type="radio"/> 1-2 years ago</p> <p><input type="radio"/> 3-4 years ago</p> <p><input type="radio"/> 5+ years ago</p> <p><input type="radio"/> I have never visited a national park.</p> <p>4. To your best recollection, within the last 5 years how many visits have you made to national parks, including repeat visits to the same park(s)?</p> <p><input type="radio"/> 1-4 visits</p> <p><input type="radio"/> 5-9 visits</p> <p><input type="radio"/> 10-15 visits</p> <p><input type="radio"/> 16+ visits</p> <p><input type="radio"/> I have never visited a national park.</p>
Device

Monica Blaser Professional Project - NPS Mobile Apps	
5. On what operating system does your main mobile device run?	
<input type="radio"/> Android	
<input type="radio"/> BlackBerry	
<input type="radio"/> iOS (Apple)	
<input type="radio"/> Windows	
<input type="radio"/> I don't know	
6. Can your primary mobile device access the internet?	
<input type="radio"/> Yes	
<input type="radio"/> No	
7. If so, what is your network connection? (select all that apply)	
<input type="checkbox"/> 1X	<input type="checkbox"/> 4G LTE
<input type="checkbox"/> 2G	<input type="checkbox"/> WiFi
<input type="checkbox"/> 3G	<input type="checkbox"/> I don't know
<input type="checkbox"/> 4G	<input type="checkbox"/> N/A
Applications & Features	
8. Have you previously used a National Park Service mobile application?	
<input type="radio"/> Yes	
<input type="radio"/> No	
Applications & Features	
9. Please identify the National Park Service apps you have used. (Select all that apply)	
<input type="checkbox"/> NPS National Mall and Memorial Parks	
<input type="checkbox"/> NPS Yosemite	
<input type="checkbox"/> NPS Yellowstone Geysers	
<input type="checkbox"/> NPS Boston	
<input type="checkbox"/> NPS Chesapeake Explorer	
<input type="checkbox"/> NPS Independence: National Historical Park Pennsylvania	
Other (please specify)	
<input type="text"/>	

Monica Blaser Professional Project - NPS Mobile Apps

10. Are there any other tourist applications (e.g. booking sites, travel review sites) you have used?

- ☐ Yes
☐ No

Applications & Features

11. Please indicate the reason you have not used a National Park Service app:

12. Are there any other tourist applications (e.g. booking sites, travel review sites) you have used?

- ☐ Yes
☐ No

Applications & Features

13. Please list a few tourist applications you have used:

14. Please select all that apply. What features did you or would you find most helpful as part of the national park or other tourist application(s) you used:

- ☐ Personalized tours
☐ Maps
☐ Wildlife guides
☐ Interactive educational games
☐ Destination information (admission costs, hours of operations)
☐ Visitor notifications (parking, daily events)

Other (please specify)

Monica Blaser Professional Project - NPS Mobile Apps

15. What are features, if any, you would add to the national park or other tourist application (s) you have used?

16. Should a national park or other mobile tourist application(s) have the capability to run entirely offline?

☐ Yes

☐ No

17. Do you find national park or other tourist applications that utilize GPS alerts helpful?

☐ Yes

☐ No

18. Would you download a mobile application that incorporates a way-finding aspect using GPS to help navigate a national park?

☐ Yes

☐ No

19. Would you download a mobile application guide that encompasses the area of an entire state?

☐ Yes

☐ No

Learning Preferences

20. I would like to use my smart phone or tablet for increasing the number of opportunities to learn about a national park in areas such as:

	Yes	No
History	<input type="radio"/>	<input type="radio"/>
Culture	<input type="radio"/>	<input type="radio"/>
Nature	<input type="radio"/>	<input type="radio"/>

21. I would learn best from a mobile application with a tour function that uses text and pictures.

Highly Disagree					Highly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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22. I would learn best from a mobile application with a tour function that uses audio and video.

Highly Disagree ☐ ☐ ☐ ☐ Highly Agree

23. I would learn best from a mobile application that uses interactive games.

Highly Disagree ☐ ☐ ☐ ☐ Highly Agree

24. Who would be the primary user of a national park mobile app in your family?

☐ Yourself

☐ Significant Other

☐ Kids

Other (please specify)

Purchasing

25. Would you pay for additional features inside a free mobile application?

☐ Yes

☐ No

26. What is the most you would pay for additional features inside a free mobile application?

☐ Free

☐ \$.01 - \$.99

☐ \$1.00 - \$1.99

☐ \$2.00 - \$2.99

☐ \$3.00 - \$3.99

☐ \$4.00+

27. Would you be willing to purchase a mobile application for use in a national park that was NOT sponsored by the National Park Service?

☐ Yes

☐ No

Demographics

Monica Blaser Professional Project - NPS Mobile Apps**28. Gender:**

- ☐ Male
☐ Female

29. What is your age?**30. Including yourself, how many people currently live in your household?**

Total number of people in household (including yourself)

How many are children under the age of 17?

31. What is your ethnicity?

- ☐ White/ Caucasian ☐ Asian/ Pacific Islander
☐ Black/ African American ☐ Native American
☐ Hispanic/ Latino

Other (please specify)

Appendix B
Usability Test Worksheet to Be Completed by the Researcher

___ of 10

USABILITY TEST WORKSHEET

Did user complete tasks successfully?

If so, how fast do they perform each task? Is that fast enough to satisfy them? What paths do they take in trying? Do those paths seem efficient to them?

Where did they stumble? What problems did they have? Where do they get confused?
What words or paths are they looking for which aren't in the app?

What did the user learn while using the app?

What was the overall message the user gained?

Specific Computer/Software used for this Test:

PC or Phone: _____

Operating System: _____

Browser and Version: _____

Screen Resolution: _____

	Not at all	Somewhat	Okay	Good	Excellent
Experience completed the tasks?					
Visual design of the app?					
How useful was the content of the app?					
Overall Experience?					

Comments?

Appendix C
Usability Test Worksheet to Be Completed by the Participant

USABILITY TEST WORKSHEET

___ of 10

	Not at all	Somewhat	Okay	Good	Excellent
Experience completing tasks?					
Visual design of the app?					
How useful was the content of the app?					
Overall Experience?					

Comments?

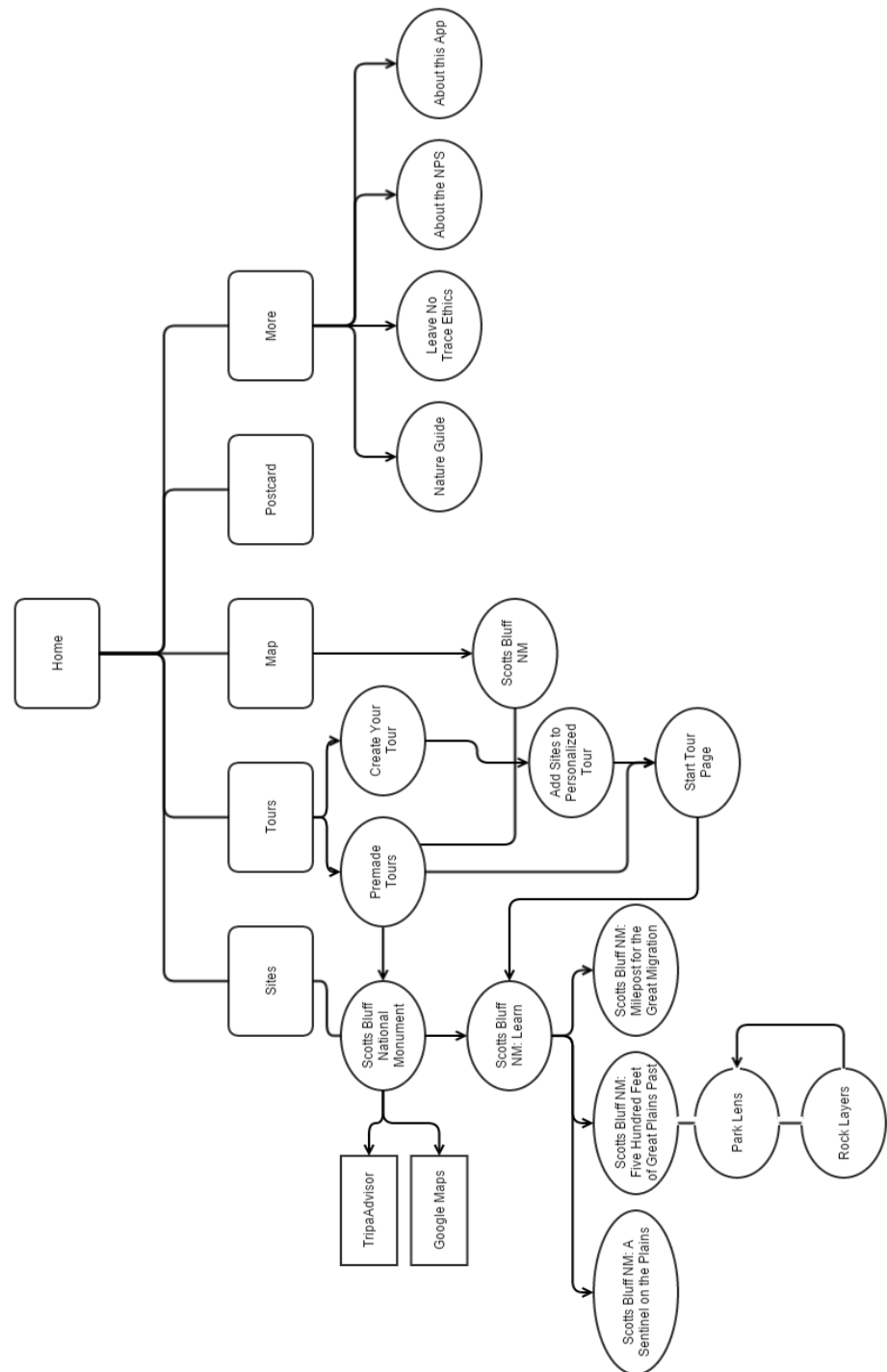
Appendix D

Contingency Table of Park Usage among Survey Respondents:
Last Visit Compared to Number of National Park Visits within the Last Year.

	1-4 visits	5-9 visits	10-15 visits	16+ visits	Never visited	Total
Less than a year ago	27	39	32	47		145
1-2 years ago	17	10	4	2		33
3-4 years ago	5	1				6
5+ years ago	5				1	6
Never visited					10	10
Total	54	50	36	49	11	200

Appendix E

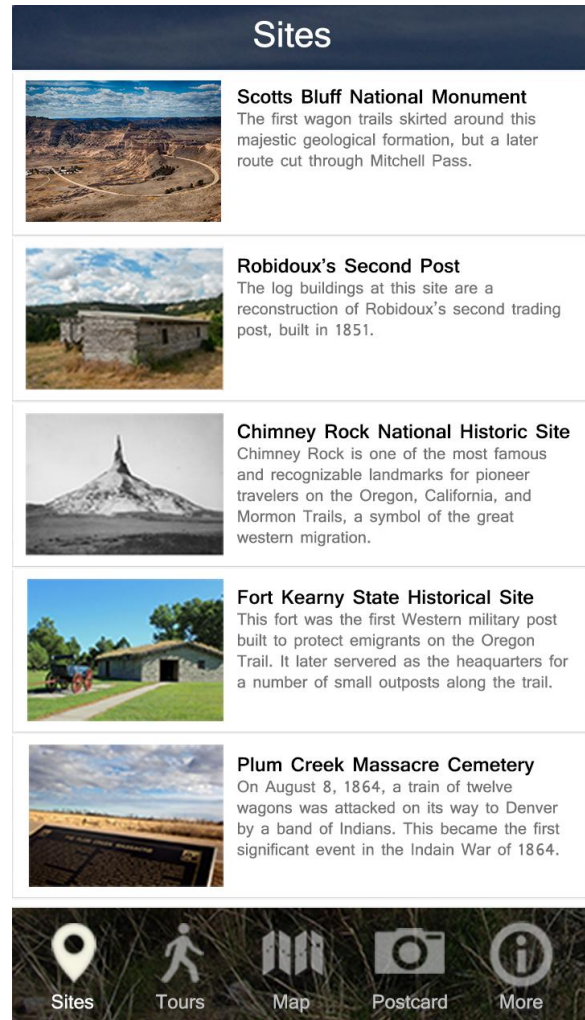
Visual Map of the Oregon National Historic Trail Mobile Application

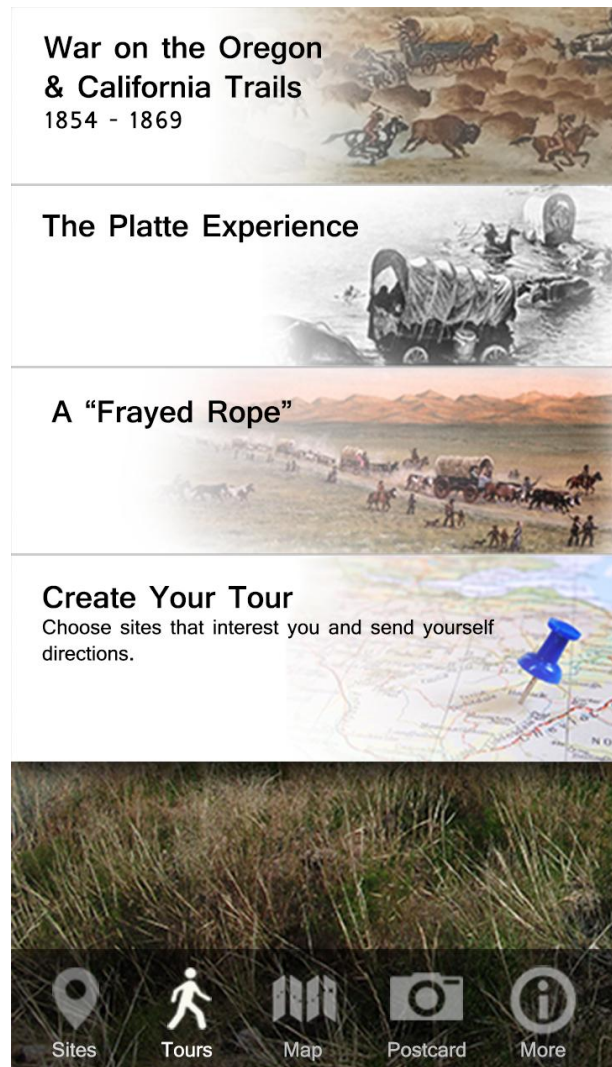
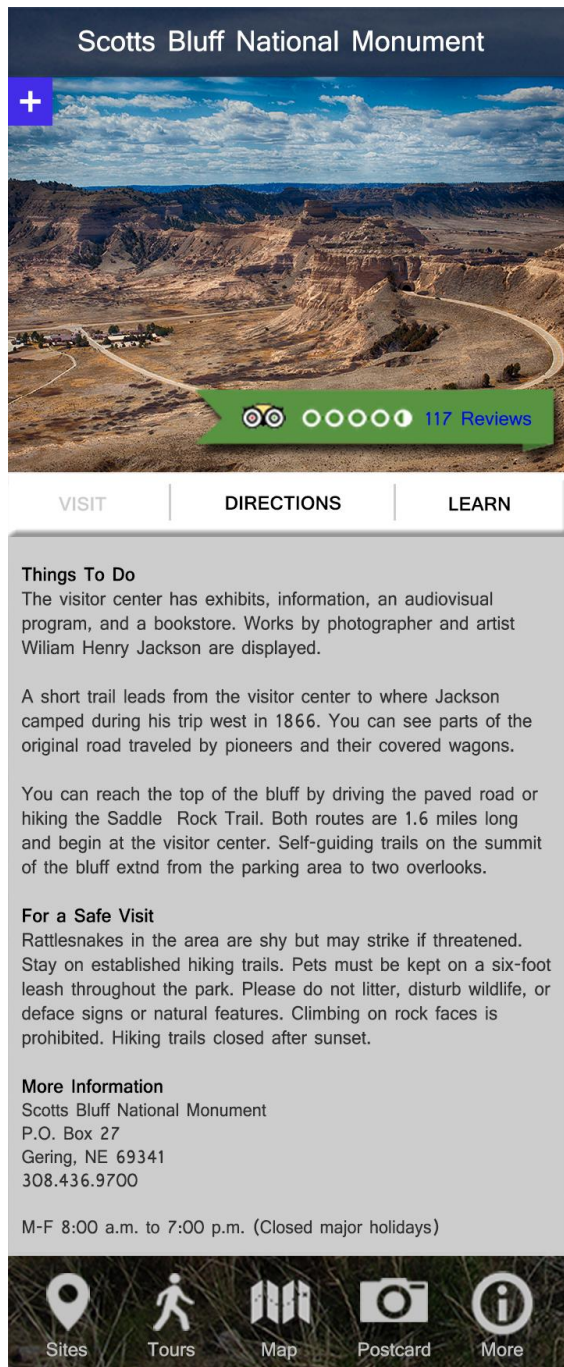


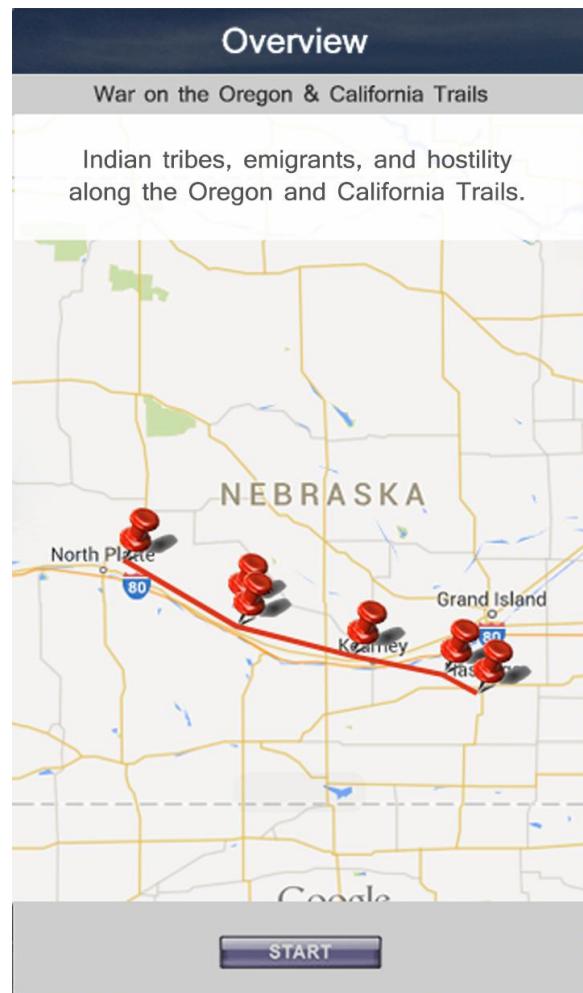
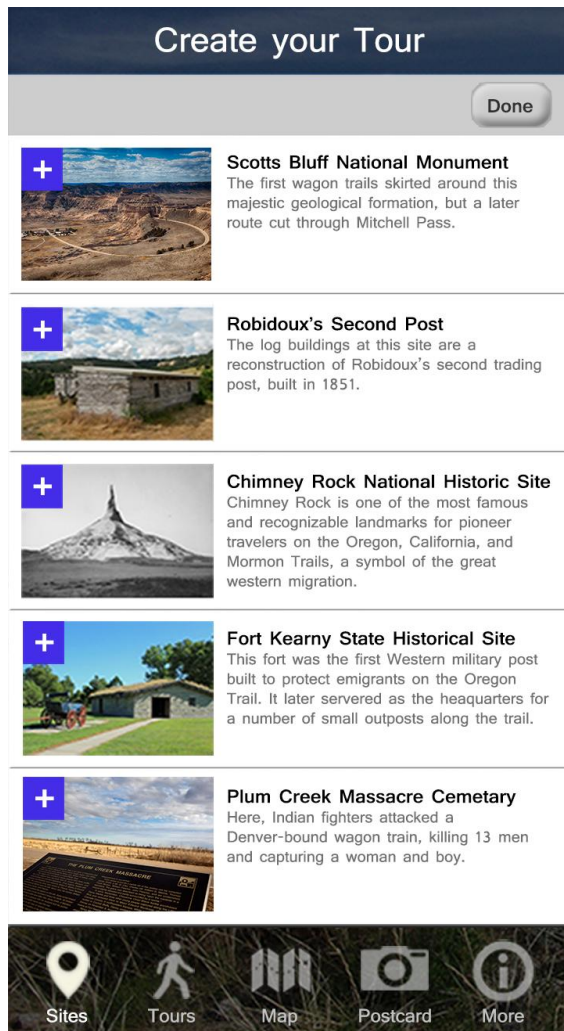
Appendix F

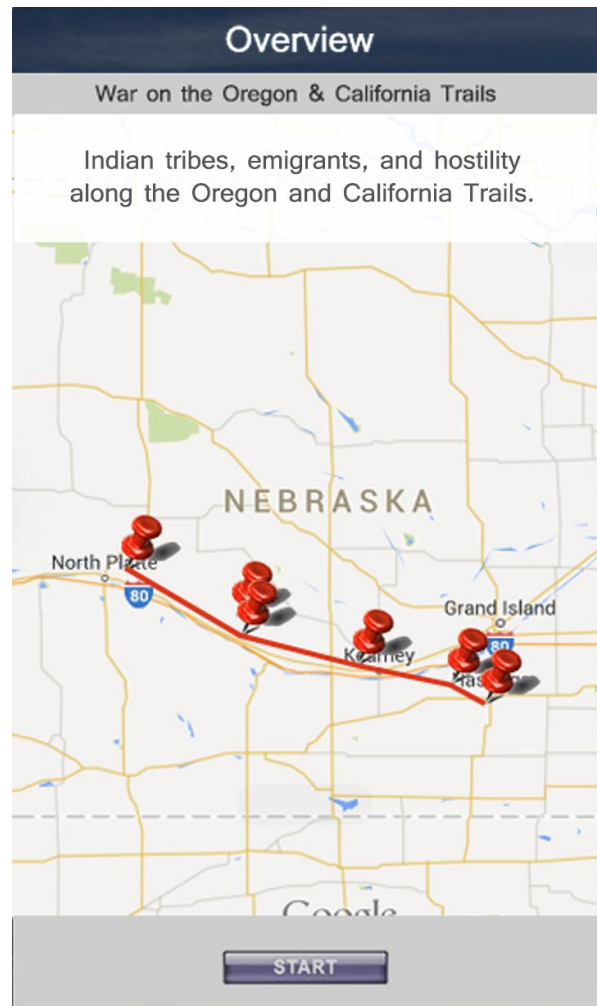
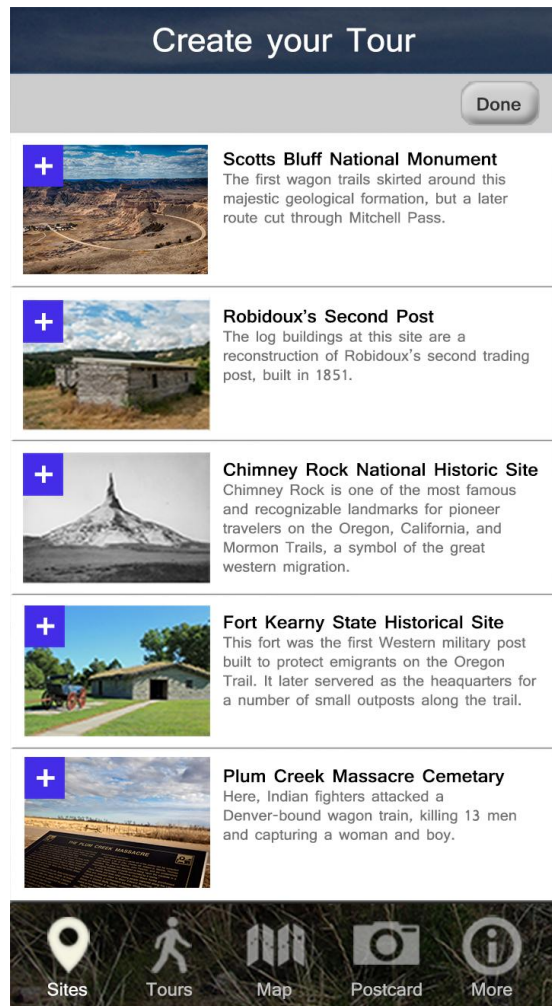
Detailed Page Images of the Oregon National Historic Trail Mobile Application

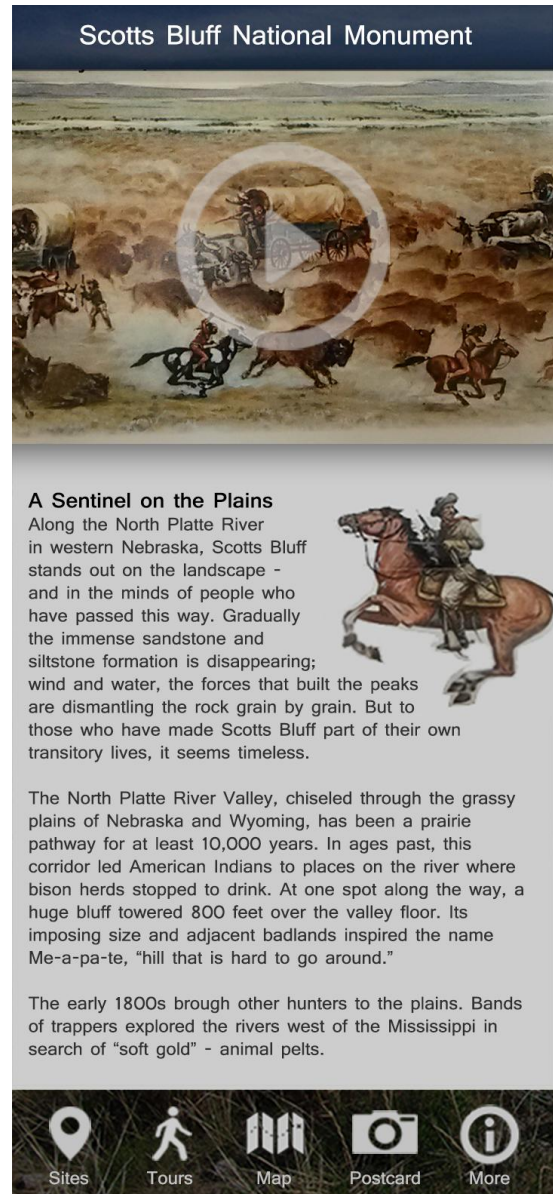
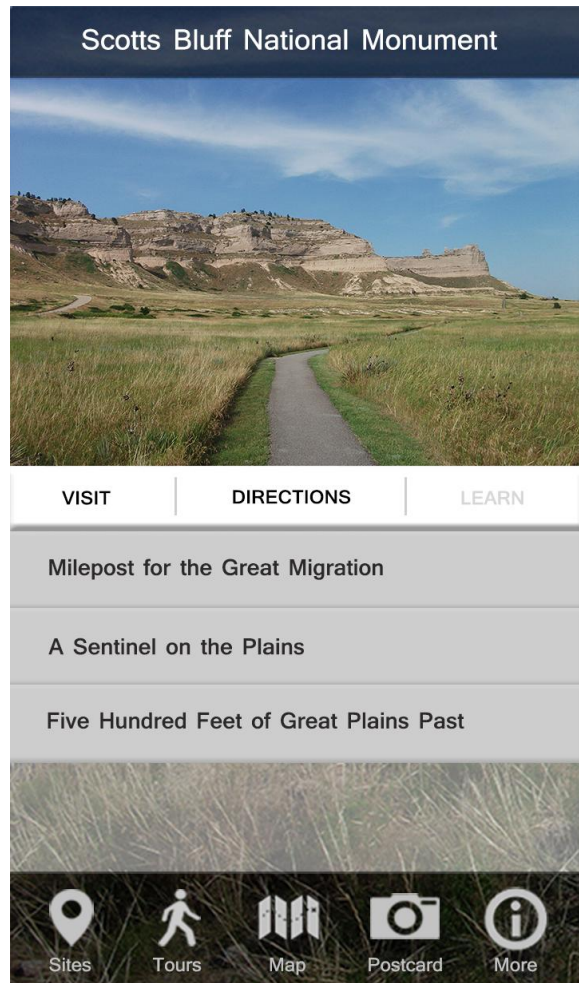
Note: The images and written interpretive material within the prototype of this mobile application were used under the fair use doctrine for educational purposes. If this mobile app were to be produced in any official capacity by any person(s), permissions for use of images and written interpretive materials would need to be obtained or otherwise replaced.













Scotts Bluff National Monument








Milepost for the Great Migration
For some, the vision of a pioneer's paradise elicited optimism. Others gave up hope for a prosperous life in the East and looked westward for land, wealth, or religious freedom. Whatever the reasons, in the years 1841-1869 some 350,000 people joined wagon trains that rallied at jumping-off points along the Missouri River and set out westward on the California and Oregon trails.




An early advocate of Oregon settlement proclaimed the route "easy, safe, and expeditious." Emigrants found it otherwise. Cramping up to a ton and a half of worldly goods into a 10-by 4-foot canvas-topped wagon - walking alongside to lighten the load for draft animals - travelers faced unpredictable weather, violent winds, quicksand, floods, disease, buffalo stampedes, and, rarely, Indian attacks. Each mile was hard-won.

As the skyline along the Platte River began to reveal its strange scenery, emigrants knew for sure they were in western lands.

 Sites
  Tours
  Map
  Postcard
  More

Scotts Bluff National Monument








Use the park lens to learn more about rock formations.

Five Hundred Feet of Great Plains Past
Scotts Bluff is a remnant of the ancestral high plains - hundreds of feet higher than the present Great Plains - that formed in the continent's interior after uplifting of the Rocky Mountains.

By examining the 10-million-year timeline of Eagle Rock, geologists have determined the origin of the various materials deposited on this ancient plains by wind, water, and occasional volcanic eruptions, as well as the approximate age of each layer.

Four or five million years ago, the land began to erode faster than new strata were deposited. Some limestone concretions in isolated patches near the surface happened to be more durable than the surrounding material.

Known as cap rock, this stone roof has protected Scotts Bluff so far from the same fate as the adjacent badlands. Thus Scotts Bluff survives as a chapter in human history as well as the remote geological past. However, Scotts Bluff, like nearby Chimney Rock and Courthouse and Jail Rock, has been and continues to be weathered out of geologic deposits of alluvial origin that made up the ancient high plains of the region prior to regional uplifting.

 Sites
  Tours
  Map
  Postcard
  More

